
INTRODUCTION

1.1 BACKGROUND

The Department of Energy's (DOE) Environmental Management (EM) program was created in 1989 to manage the cleanup of the legacy of 50 years of nuclear weapons production and research at over 130 sites in 33 States and Puerto Rico (see Figure 1-1). These sites comprise a combined area of approximately 3,300 square miles. The Department faces the task of addressing nearly 10,000 individual remediation challenges throughout the DOE complex. In addition, over 7,000 contaminated Department-owned buildings are no longer needed and require monitoring until they can be safely dismantled. Almost one million cubic meters of radioactive waste and materials require safe management until treatment and disposal facilities are available.

Workers involved with the cleanup of DOE's facilities will face safety hazards from conventional construction operations as well as risks from fires and explosions, and health threats associated with exposures to toxic chemicals. In addition to all of the usual risks encountered in hazardous waste work, workers will confront high-level radioactive and mixed waste unique to DOE.

In February 1993, the Office of Technology Assessment (OTA) published its report, *HAZARDS AHEAD: Managing Cleanup Worker Health and Safety at the Nuclear Weapons Complex*. The report found that DOE's major weaknesses included:

- The failure to establish an institutional culture that honors protection of the environment, safety, and health; and
- The need to develop effective health and safety policies and programs for cleanup.

DOE's management agreed with this assessment and is currently taking steps to correct these deficiencies. To address the concerns brought forth in the OTA Report and to ensure a safe and healthful work environment, EM and the Office of Environment, Safety and Health (EH) formed a strategic alliance. This strategic alliance is designed to provide guidance and performance expectations for the full range of EM activities and for the integration of requirements to increase cost-efficiency and effectiveness. By coupling the health and safety expertise of EH with the nationally critical mission EM is

Occupational Safety and Health Administration Regulations and DOE Orders

Although the Department of Labor's Occupational Safety and Health Administration (OSHA) regulations are not legally enforceable at DOE facilities, DOE has adopted OSHA's Health and Safety Standards (29 CFR 1910 and 29 CFR 1926) in DOE O 440.1, "Worker Protection Management for DOE Federal and Contractor Employees." 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response" (HAZWOPER Standard), contains comprehensive provisions to protect workers engaged in hazardous waste remediation and management, and emergency response operations. For the purposes of this Handbook, the term "HAZWOPER" refers to 29 CFR 1910.120, 29 CFR 1926.65, and their amendments. Numerous other DOE Orders set forth specific requirements on safety and health programs, industrial hygiene, construction safety, occupational medicine, and nuclear safety.

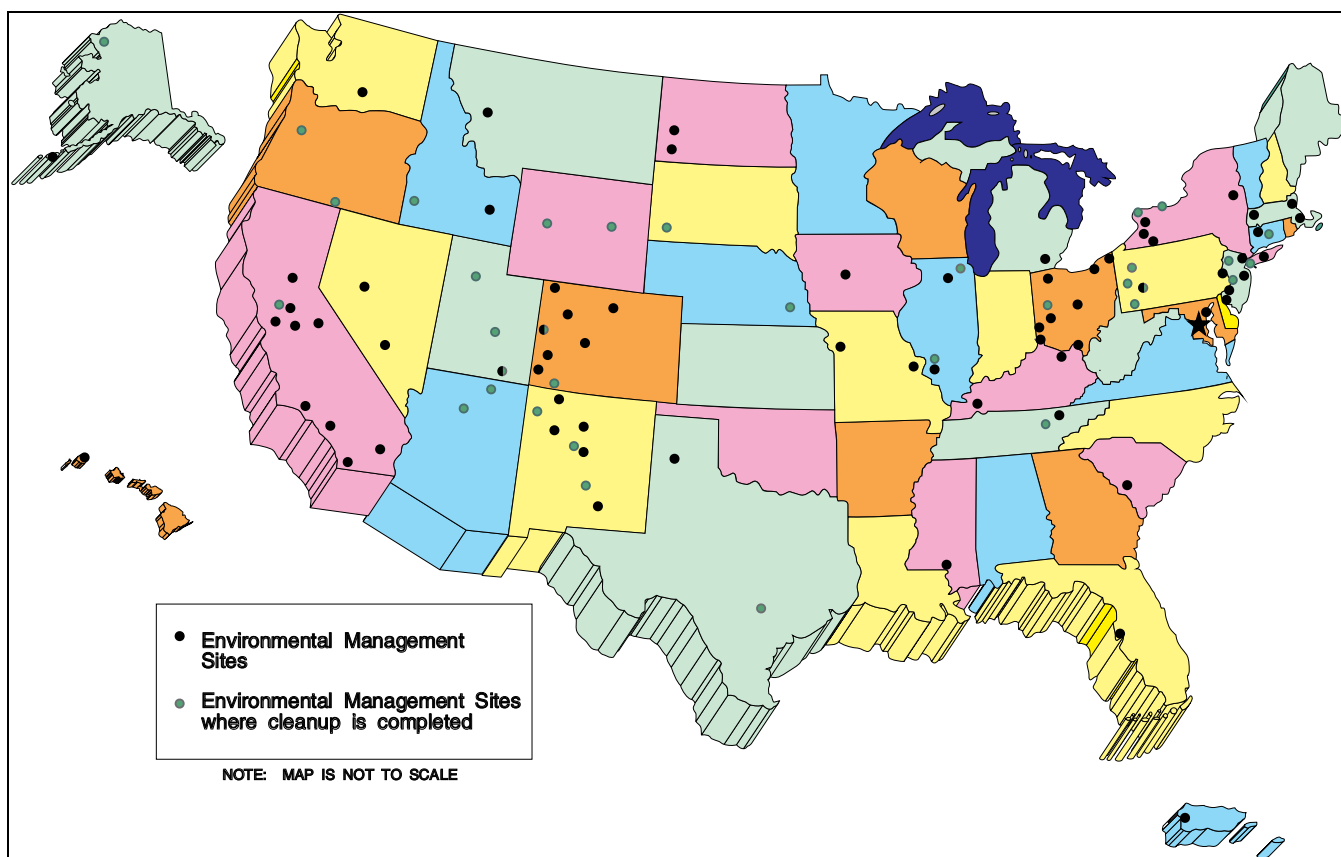


Figure 1-1. Location of Environmental Management Sites

undertaking, DOE will accelerate the development of an operational culture where worker health and safety is an integral part of day-to-day work. In addition, DOE is drawing on industry experience to create an integrated, comprehensive, and standards-based program to protect workers involved in hazardous waste activities. As part of this initiative, a series of occupational safety and health guidance documents have been developed. These products include:

- *Management Perspectives on Worker Protection During DOE Hazardous Waste Activities*, which is aimed at managers whose sites or facilities have been designated for hazardous waste activities and which provides a broad overview of health and safety requirements;
- *Working Safely During DOE Hazardous Waste Activities*, which is aimed at workers and provides ways to minimize radiological, safety, chemical, biological, and natural hazards and reinforces health and safety and radiological training; and
- *Handbook for Occupational Health and Safety During Hazardous Waste Activities* (this Handbook).

This Handbook addresses four key areas cited in the OTA report as critical to DOE's successful long-term management of cleanup of its hazardous waste sites: (1) improving characterization data (Chapter 5); (2) improving contracting practices (Chapter 3); (3) implementing OSHA worker protection standards (Chapters 2 and 3); and (4) providing for active, informed worker participation (Chapters 3 and 4). In addition, the Handbook discusses some aspects of HAZWOPER implementation that the OTA report referred to as "controversial": (1) provisions for dividing sites into work zones (Chapter 7); (2) methods for monitoring worker exposure and determining acceptable exposure levels (Chapter 5); criteria for workers' inclusion in medical surveillance programs and the minimum number of hours of training (Chapters 4 and 9); adequacy of emergency response programs (Chapter 10); and the content of medical surveillance programs (Chapter 9).

Lastly, DOE's management-level commitment to and accountability for worker health and safety are emphasized in Chapter 3 and are evident throughout the Handbook. This Handbook is intended to provide technical guidance, recommendations, and alternative approaches for achieving effective worker protection during hazardous waste activities without creating new requirements. It is unique because it provides guidance for certain challenges specific to the DOE environment, such as:

- Remedial actions involving radiological hazards as well as chemical, flammable, explosive, industrial, and construction-related hazards.
- Activities neither explicitly identified nor necessarily intended to fall within the scope of the HAZWOPER Standard such as deactivation and decommissioning. (Note: Decommissioning consists of decontamination and dismantlement, which is known as D&D. Certain DOE decommissioning activities involving hazardous waste are covered by the Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] and fall under HAZWOPER. Please refer to Chapter 2 of this Handbook.)
- The need to implement DOE Orders and other requirements while integrating OSHA approaches and requirements.
- Remediations at large, active reservations.
- Transitional activities from operation to remediation.

1.2 PURPOSE AND OBJECTIVES

This Handbook discusses approaches and strategies to achieve compliance with 29 CFR 1910.120. Moreover, it discusses strategies to integrate DOE rules and requirements with HAZWOPER, such as DOE Orders regarding construction health and safety, industrial hygiene, nuclear safety, and radiological protection; the *Draft DOE Radiological Control Technical Standard* (formerly known as the DOE RadCon Manual); and various DOE limited standards.

The objectives of this Handbook are to provide guidance to:

- Prevent and reduce worker injury and illness;
- Determine the scope and application of the HAZWOPER Standard;
- Implement DOE hazardous waste-related requirements through enhancements of existing programs;
- Clarify HAZWOPER scope and applicability to activities that may not be specifically defined within the scope of the HAZWOPER Standard;
- Promote consistency in health and safety programs for hazardous waste activities;
- Encourage a high standard for health and safety in concert with optimum productivity, cost-effectiveness, and efficiency; and
- Share successful and effective approaches that have been implemented across the DOE complex.

A key purpose of this Handbook is to encourage the establishment of health and safety programs that use hazard-based judgments to promote efficiency, productivity, and cost-effectiveness in concert with enhanced worker protection.

1.3 SCOPE

This Handbook addresses the variety of hazardous waste activities conducted within the DOE complex and the specific activities and types of worksites that fall within the scope of the HAZWOPER Standard, including the following:

- Uncontrolled hazardous waste site cleanups, including EPA National Priorities List (NPL) or state priority list sites; voluntary or government-required cleanups; and initial investigations to determine the absence or presence of hazardous wastes or substances;
- Resource Conservation and Recovery Act (RCRA) corrective action cleanup sites;
- RCRA treatment, storage, and disposal (TSD) facilities; and
- Emergency response operations involving the release (or substantial threat of release) of hazardous wastes and substances.

It also provides guidance for other types of DOE activities that may involve hazards similar to those found in the cases cited above, many of which have been the subject of debate concerning applicability of traditional hazardous waste approaches, including the following:

- Deactivation and certain D&D activities that do not fall under CERCLA;
- Surveillance and maintenance;
- Non-RCRA-permitted TSDs;
- Construction;
- Laboratory activities;
- Research and development (R&D) activities; and
- Satellite accumulation sites.

Deactivation and Decommissioning

Deactivation is the process of placing a facility in a safe and stable condition that is protective of workers, the public, and the environment until decommissioning is completed. Decommissioning includes those activities that take place after a facility has been deactivated and placed in an ongoing surveillance and maintenance program.

Decommissioning can include decontamination and dismantlement.

- Decontamination is the removal of radioactive or hazardous contamination.
- Dismantlement involves the disassembly or demolition and removal of structures, systems, or components of a facility.

Decommissioning (D&D) proceeds to remediation.

1.4 THE HAZARD-BASED APPROACH

Remedial actions and associated activities at hazardous waste sites can range from low-risk, short-term to high-risk, full-scale, long-term remediation activities. Deactivation and D&D actions can range from stabilization of multiple hazards at a site or facility containing radioactive or chemical contamination, or both, to routine asbestos entire abatement in a non-industrial structure. Strategies include programs that meet compliance objectives, protect workers, and make certain that productivity and cost-effectiveness are maintained. The content and extent of health and safety-related programs should be proportionate to the types and degrees of hazards and risks associated with specific projects. This Handbook implements the objective of a hazard-based approach by providing:

- A systematic process for integrating the elements of the HAZWOPER Standard with other OSHA, DOE, and DOE-adopted nuclear and nonnuclear rules, requirements, and guidance to maximize both worker protection and compliance in performing hazardous waste activities;
- A multidisciplinary team-based process to plan, organize, evaluate, and conduct hazardous waste activities;
- A training philosophy that considers HAZWOPER applicability, nature of the work, level of hazard, and roles and responsibilities in training program design;
- An approach to the development of the worksite health and safety plan (HASP) and the associated work control system that is commensurate with the expected risks to the worker and the public; and
- An access and hazard control strategy based on a hierarchical application of engineering controls, administrative controls, and use of personal protective equipment (PPE).

Integrating DOE Orders With HAZWOPER

Integrating DOE Orders with HAZWOPER is essential for conducting hazardous waste activities. DOE classifies its facilities and sites based on radiological and hazardous material inventories. Safety Analysis Reports (SARs) are developed in accordance with DOE 5480.23, "Nuclear Safety Analysis Reports." This Order requires an evaluation of hazards (associated with the radiological and hazardous materials inventories) to the general public, the workers, and the environment. Other Orders and requirements address such topics as radiation limits to the public and the workers. The *Draft DOE Radiological Control Technical Standard* provides non-mandatory guidance for radiological health and safety. DOE Orders are currently enforceable through contracts with the management and operating (M&O) contractors that operate the Department's facilities. The nuclear safety Orders are in the process of being issued as rules in response to the Price-Anderson Act Amendments so that they are directly enforceable on the contractors and provide for both civil and criminal penalties.

1.5 DOCUMENT ORGANIZATION AND AUDIENCE

This Handbook has been written for those who plan and conduct DOE hazardous waste-related activities. It is designed to serve as a bridge between management and the health and safety community—that is, between hazardous waste project managers, field team leaders, supervisors, and project planners; and site safety and health officers (SSHOs), HAZWOPER coordinators, and other health and safety professionals. The intent of the Handbook is to serve as a benchmark for hazardous waste activities within DOE and to foster common understanding and focus among DOE and contractor personnel.

This Handbook is organized into nine technical chapters which parallel the process to be used in the organization, planning, and implementation of hazardous waste activities. This organization is depicted in Figure ES-1.

Topics to the left and top of the graphic represent critical management and planning functions that occur prior to initiation of hazardous waste activities and operations. These include:

- Determining the scope and application of the HAZWOPER Standard and providing a basis for the integration of the various DOE rules and requirements (Chapter 2);
- Establishing organizational structures, creating a multidisciplinary project team, and initiating critical planning functions (Chapter 3);
- Determining training requirements and implementing a comprehensive training program that integrates existing training activities (Chapter 4);
- Characterizing worksite hazards and assessing worker exposures to provide a basis for determining worker health and safety requirements (Chapter 5); and
- Preparing a worksite HASP and establishing work control systems (Chapter 6).

Topics to the right and bottom of the graphic represent key operational activities that are necessary to support the conduct of safe and cost-effective hazardous waste activities. These include:

- Implementing an access and hazard control strategy that incorporates the necessary blend of engineering controls, administrative controls, and use of PPE to support worker protection and cost-effective hazardous waste operations (Chapter 7);
- Providing appropriate technologies and systems to support worker and equipment decontamination activities and minimize contamination of clean areas (Chapter 8);
- Establishing a comprehensive medical surveillance program that monitors worker activities and exposures and provides for timely indication of the effectiveness of access and hazard controls (Chapter 9); and
- Initiating an effective emergency preparedness program which serves to minimize any impact to the worker, the public, and the environment (Chapter 10).

1.6 REFERENCES

29 CFR 1910.120 and 1926.65, "Hazardous Waste Operations and Emergency Response"

DOE O 440.1, "Worker Protection Management for DOE Federal and Contractor Employees"

DOE 5480.4, "Environmental Protection, Safety, and Health Protection Standards"

DOE 5480.23, "Nuclear Safety Analysis Reports"

DOE/EH-0227P, OSHA Training Requirements for Hazardous Waste Operations

DOE-STD-1098-96, *Draft DOE Radiological Control Technical Standard*

DOE/EH/EM, *Management Perspectives on Worker Protection During DOE Hazardous Waste Activities*

DOE/EH/EM, *Working Safely During DOE Hazardous Waste Activities*

Office of Technology Assessment, *HAZARDS AHEAD: Managing Cleanup Worker Health and Safety at the Nuclear Weapons Complex*, OTA-BP-O-85, February 1993